TUNNELS.

The tunnelling upon the Great Western Railway, for the first 20 miles out of Bristol, amounts to nearly 4 miles in length. There are five tunnels on the London and Brighton Railway, amounting in length to 3 miles 76 chains; and this line is only 56½ miles in length. There is a single tunnel upon the Huddersfield and Ashton Canal, 3¼ miles in length, with shafts 800 and 1000 feet deep. The single Summit Tunnel, now executing on the Sheffield and Manchester line of Railway, exceeds this tunnel in length by 8 chains, and is constructed by sinking 5 shafts, averaging in depth 514 feet, and amounting in all to 2571 feet. I propose executing this tunnel (on the proposed line of the Caledonian Railway) by sinking 10 shafts, being double the number of those on the Sheffield line. The average depth of the shafts will be 223½ feet; and the whole shafting, 2236 feet. Thus, the separate shafts on this tunnel will be less than one-half the depth of those on the Sheffield Line; and, by sinking double the number, the depth of shafting will be less by 335 feet. There are nine tunnels proposed on the East Coast Line from Edinburgh to Newcastle, which amount to 3 miles and 52 yards. The expense, in cutting, at the entrance to each of these tunnels, so as to make them as short as possible, is very great indeed. The gradient of the Box Tunnel, 2 miles in length, upon the Great Western, is 1 in 100; the gradient of this proposed tunnel is 1 in 200.

Having shewn, by taking the aggregate length of different tunnels upon several lines of railway executed, in progress, and proposed, that they are equal to or exceed this proposed tunnel, the question may be asked, Why is a single long tunnel considered a work of difficulty, whilst numerous small tunnels, however long the aggregate length may be, are not comparatively thought much of? In general, wherever a tunnel is proposed, it is made in preference to open cutting, on account of its being executed more cheaply, the depth of cutting having increased to such an extent that to tunnel would be cheaper than an open cut: and, in general, the longer the tunnel the higher is the incumbent material above the rails, causing a very great additional expense in sinking shafts, thereby lessening their number, and thus increasing the length of driftway between the shafts; the great depth causes also a greater body of water to flow into the tunnel, to get rid of which is one of the greatest expenses in tunnelling; few shafts being sunk, prolongs the time of execution, thereby causing the water to be pumped for a long period of time; these, with several other causes, are natural reasons why a long tunnel should cost much more per cubic yard than a short one. Again, the material through which a tunnel has to be cut is a most important matter. In tunnelling through soft material, or through regular seams of rocks of small thicknesses, arching is required: the mere cutting out of the material in such cases is done for less than one-half of what a cutting through hard unstratified rock will cost; but an extra opening is required to be cut all round to make room for the lining; in cutting down short lengths for lining, the top, and often the sides, have to be well timbered. In a tunnel having few and deep shafts, and where this is required, the cost per cubic yard comes very high, on account of the want of room for the men to work in with advantage. In a small compass there are combined together miners, carpenters, bricklayers, masons, and labourers, all in each other's way; masonry, lime, and timber coming into the tunnel for lining, centering, and propping, at the same time that the mining and excavating are going forward. In the other case, where the tunnel requires no lining, although the mere mining per cubic yard costs more, yet all other things considered, the whole tunnel is executed for nearly one-half of what it would cost if lining were required; thus Mr. Locke, in estimating the summit tunnel upon the Sheffield and Manchester line, calculated 100,000*l.* as the cost, if through hard material, and 200,000*l.* if through soft and requiring lining. Again, the cost of tunnels must vary according to the size they are made. Several old tunnels upon canals, completed without any towing-path, have been executed for 4*l.* per running yard. The old tunnel upon the Grand Trunk Canal, at Harecastle, in Staffordshire, constructed by Brindley, cost only 3*l.* 10*s.* 8*d.* per running yard; it was 10 feet in diameter, and consisted merely of a semicircular brick arch, which sprung from the water-line of the Canal.—*Mr. Lowe's Report on the Caledonian Railway.*

PROPOSED JUNCTION OF THE PACIFIC AND ATLANTIC OCEANS.

In Mr. Stephens's "Travels in Central America," he advocates the bold design of joining the Atlantic with the Pacific Ocean, by means of a canal between the Gulf Nicoya and the harbour of San Juan, a distance of only about sixteen miles. From the lake of Nicaragua to the harbour of San Juan, on the Pacific, the distance is less than sixteen miles; and this slender line of earth is the only important obstacle which impedes what would undoubtedly be the greatest, the most important alteration ever effected by man in the physical arrangement of the globe. The proud mountains of Central America here bend themselves down—as if to permit and sanction the enterprise—to the trivial elevation of 600 feet; and through this hill it is contemplated to cut a tunnel of one mile in length, at the height of almost seventy-two feet above the water of the lake, and two hundred feet above the low-water level of the Pacific; the distance from the lake to the tunnel being about ten miles, and from the tunnel to the Pacific about four miles, whilst the difference of level could easily be overcome by lockage. The only engineering difficulty in the execution of the work would be the tunnel; and we must confess that the idea of an excavation lofty enough to permit ships of six hundred tons to pass through with their lower masts standing, is to us, even in these days, when engineers take all manner of liberties with mountains and valleys, somewhat startling; but Mr. Stephens speaks of it with perfect coolness.—*Quarterly Review.*

ROYAL COMMISSION OF FINE ARTS.

Whitehall, 16th June, 1843.

Her Majesty's Commissioners hereby give notice:—

1. That whereas carve-work in wood will be required for various parts of the New Palace at Westminster, and in the first instance for the doors of the House of Lords, artists are invited to send specimens in this department of art, to be exhibited for the purpose of assisting the Commissioners in the selection of persons to be employed.

2. The specimens are to be sent in the course of the first week in March, 1844, to a place of exhibition hereafter to be appointed.

3. The specimens are required to be designed in general accordance with the style of decoration adopted in the New Palace. Outlines in lithography, shewing the dimensions of the principal door of the House of Lords, may be obtained at the architect's offices in New Palace-yard.

4. Each exhibitor is required to send one and not more than two designs for an entire door, drawn to the scale adopted in the outline—viz. two inches to a foot; and one carved panel; or part of a panel and frame-work, not exceeding four feet in the longest dimensions, representing a part of such design in the full proportion. The objects forming the details of decoration, in conformity with the conditions above expressed, are left to the choice of each artist. The material of the carved specimen is to be oak.

5. The invitation to send works for the proposed exhibition is confined to British artists, including foreigners who may have resided ten years or upwards in the United Kingdom.

6. Artists who propose to exhibit are required to signify their intention to the secretary on or before the 1st of January, 1844.

By command of the Commissioners,
C. L. Eastlake, Sec.

Whitehall, 16th June, 1843.

Her Majesty's Commissioners hereby give notice:—

1. That whereas various windows in the New Palace at Westminster will be decorated with stained glass, artists are invited to send specimens in this department of art, to be exhibited for the purpose of assisting the Commissioners in the selection of persons to be employed.

2. The specimens are to be sent in the course of the first week in March, 1844, to a place of exhibition hereafter to be appointed.

3. The specimens are required to be designed in general accordance with the style of architecture and decoration adopted in the New Palace. Outlines in lithography, shewing the dimensions of the windows, may be obtained at the architect's offices in New Palace-yard.

4. Each exhibitor is required to send one and not more than two coloured designs for an entire window, drawn to the scale adopted in the outline—viz. two inches to a foot; and one specimen of stained glass, not exceeding six feet in the longest dimensions, representing a part of such design in the full proportion. Such specimen of stained glass to be glazed up in lead, and framed in wood.

5. The objects forming the details of decoration may be either figures or heraldic devices relating to the royal families of England, or a union of the two, and may be accompanied by borders, diapered grounds, legends, and similar enrichments.

6. The invitation to send specimens for the proposed exhibition is confined to British artists, including foreigners who may have resided ten years or upwards in the United Kingdom.

7. Artists who propose to exhibit are required to signify their intention to the secretary on or before the 1st of January, 1844.

By command of the Commissioners,
C. L. Eastlake, Sec.

SOUTHAM LIME.

The following extract from an article on "Lime and Limestone," by Aiken, in the "Magazine of Science," will form an addenda to our remarks on the Southam Lime in the fourteenth number of The Builder; the blue lias stone as herein described being the same as that of Southam, lying in the same belt, stretching across from Whitby in the north-east, to Lyme-Regis on the coast of Dorsetshire:—

"Another and still more valuable variety of limestone for water-cement is the blue limestone, which is generally of a dark dove colour, and of a dull earthy aspect; by long exposure to weather it becomes, superficially at least, of a liver brown, and when burnt into lime is of a buff colour. It forms occasional beds in the transition and mountain limestone deposits, but constitutes nearly the whole of the lias limestone. This latter is one of the most remarkable of the English strata. Its geological position is between the lower oolite and the new red sandstone. It passes obliquely through the country in a direction from N.E. to S.W.; from the sea-coast at Whitby, to the cliffs at Lyme-Regis in Dorsetshire on the British Channel. In its course southward, it passes to the east of York, and crosses the Humber near the junction of the Trent and Ouse; thence it passes through the western edge of Lincolnshire, and traverses the counties of Nottingham, Leicester, Warwick, and Gloucester; its breadth in this part of its course being pretty uniformly about six miles. Hence the main body proceeds in nearly a southerly direction through Somersetshire to the coast of Dorset, while a broken line of the same skirts along the southern shore of the Bristol Channel as far as Watchet, and appears on the northern shore in detached patches in the counties of Monmouth and Glamorgan. The entire thickness of this deposit is perhaps about 250 feet; the middle part consists of beds of blue limestone, alternating with blackish slaty marl; the upper and lower parts being less calcareous than the middle, are composed chiefly of beds of marl, in which are harder masses of a compressed globular figure, less clayey than the slaty marl in which they are found, but less calcareous than the blue limestone. The quarries of Watchet, Aberthaw, and Barro, in Leicestershire, were long celebrated for the excellent water lime which they produce, before it had been ascertained from geological surveys that they are only on different parts of the same deposit. The lias limestone used by the London builders is brought from Lyme-Regis, but is little used in the metropolis, being about 25 per cent. dearer than Dorking lime, the difference in cost depending, in part at least, on the longer time and greater quantity of fuel required in burning it."